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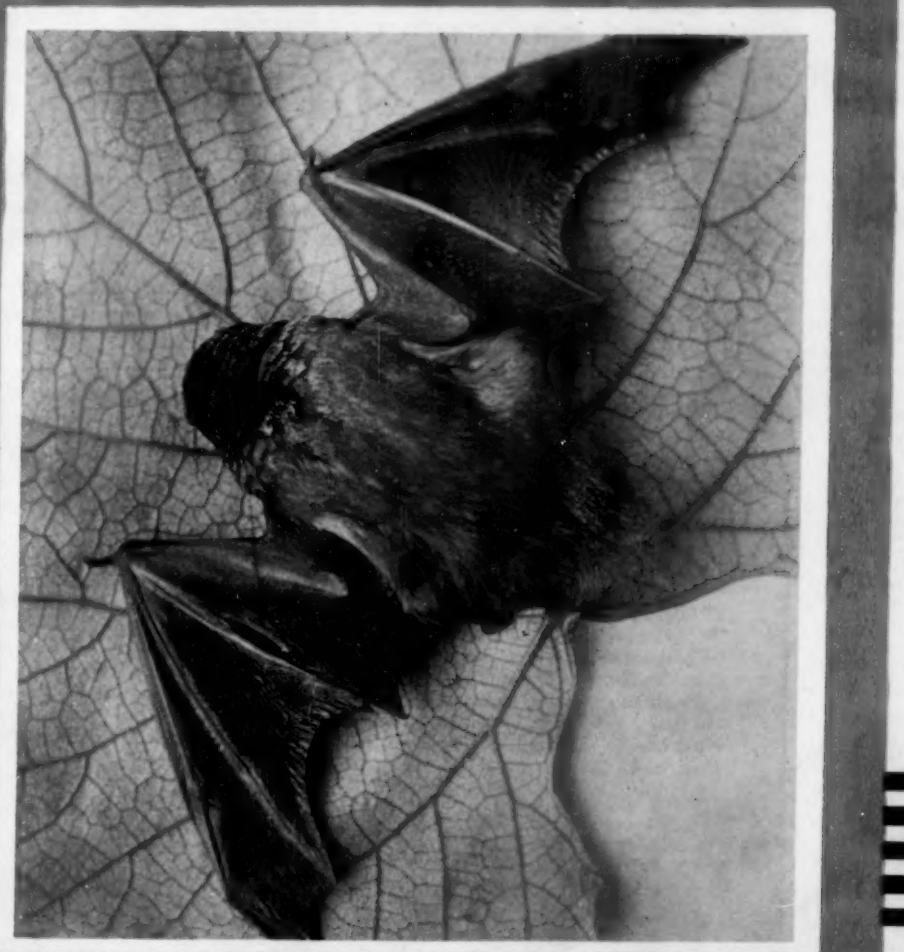
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JULY 2, 1932

Web-Fingered, to Swim the Air

See Page 11

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXII *No. 586*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

Turnip sauerkraut is a new, appetizing food suggested by the U. S. Department of Agriculture.

Radio engineers announce that they have perfected a system by which as many as 3,000 radio sets can operate independently on the same antenna without interference.

By studying plant life on the fringes of Greenland glaciers, University of Michigan scientists hope to determine whether the ice is receding or not, and thus to learn whether the world is emerging from an ice age or perhaps entering upon a new one.

The hippopotamus may not look like a "river horse" on land, but when it swims its profile justifies the name the old Greeks gave it.

According to U. S. Forest Service records for the past five years, about nine per cent. of the forest fires reported are caused by railroads.

A British physiologist believes that man would be able, without oxygen apparatus, to stand the low barometric pressure at the top of Mt. Everest, but the risk would be great.

Census figures show that approximately 22 per cent. of all deaths in this country are from communicable diseases.

Studying the pygmy Negritos of New Guinea, a Smithsonian Institution expedition found several natives with hair of reddish tinge.

One of the dinosaurs of East Africa was a giraffe-like animal which stood about thirty feet tall, including its ten-foot neck.

Experiments show that, contrary to an old opinion, butter for storage keeps as well in one-pound prints as in big tubs.

A baby gorilla brought to the New York Zoo grew a heavy winter coat and enjoyed outdoor exercise and playing in the snow.

Some American tribes tattooed the body, using cactus spines or sharp flint points as instruments.

The Sabine Villa, where the Roman poet Horace composed his famous odes, has been excavated by an American archaeologist.

WITH THE SCIENCES THIS WEEK

CURIOSITY-AROUSING questions are prepared concerning the most interesting and important news in each issue. These questions should be a mental stimulant for the adult reader and a boon to the teacher who uses the Science News Letter to add zest to her classroom instruction.

Book reference in italic type is not the source of information of the article, but a reference for further reading on the subject of the article. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

ASTRONOMY

Do stars have an aurora borealis? p. 5.

How much farther is the earth from the sun now than it was six months ago? p. 8.

What planet may have given birth to many of the comets that come within the vision of the earth? p. 6

Where in the sky were the two comets whose discovery was reported within two days by an American and an Australian astronomer? p. 11 *Comets—Charles P. Olivier—Williams & Wilkins*, 1930, $3.50.

AVIATION

Why may not airplanes of present-day design be made to fly faster than 600 miles an hour? p. 3. *Aviation and All About It—A. Frederick Collins—Appleton*, 1929, $2.

ECONOMIC GEOGRAPHY

How much of Mongolia is suitable for colonization by the Chinese? p. 10. *Contemporaries of Marco Polo—Manuel Komroff—Boni & Liveright*, 1928, $3.50.

GEOLOGY

Where will a 1200-foot hole be drilled for the sake of science? p. 3

HYDRODYNAMICS

How may the speed of a boat be doubled without increasing its power? p. 4

MEDICINE

How has a vaccine for American typhus fever been made? p. 7. *The Facts of Modern Medicine—Francis W. Palfrey—Appleton*, 1929 $5.

OCEANOGRAPHY

Why is there less light below the surface of the ocean than Dr. Hulburt calculated? p. 6

PALEONTOLOGY

What remains of ancient man have been found in Java in addition to the recently discovered Homo soloensis? p. 5. *New Discoveries Relating to the Antiquity of Man—Sir Arthur Keith—Norton*, $5.

PHYSIOLOGY

Can the coming of old age be delayed? p. 4

Of what wavelength may "human rays" be? p. 3

RADIO

Name two new pieces of apparatus for measuring reflections from the Kennelly-Heaviside layer? p. 5

ZOOLOGY

Can bats hear well? p. 11

PHYSIOLOGY

Deadly Radiations Produced From Living Human Body

German Scientist Working at Cornell Kills Yeast In Five Minutes With Radiation From Finger Tips

EVIL RAYS emitted from human blood, finger tips, the ends of noses or flashed from eyes, which have been discovered at Cornell University to kill yeast and presumably other microorganisms, may have an influence on studies of germ diseases.

As yet these studies of baneful effects, of human radiation are in their preliminary stages but Prof. Otto Rahn, eminent bacteriologist, has carried them sufficiently far to become convinced that his findings are worthy of more extended investigation.

Prof. Rahn, who formerly worked in Germany and is now professor of bacteriology at Cornell University, Ithaca, aroused great interest among scientists attending the meeting of the American Association for the Advancement of Science and the Society of American Bacteriologists in Syracuse by announcing experiments that seem to parallel scientifically in some respects old superstitions that the human body can exert an evil influence on its surroundings.

Yeast, such as is used in making bread, was killed in five minutes merely by the radiation from the finger tips of one person. When a quartz plate a twelfth of an inch thick was placed between the finger tips and the yeast, it took fifteen minutes for the yeast to die.

In experiments completed this week Prof. Rahn also found that the end of the nose and the eye produce the yeast-killing radiation. The effect of the rays from the eyes is strangely reminiscent of the "evil eye" of superstition, so far as yeast is concerned. The human chest does not produce the radiation, however. In the tests of fingers it was found that the right hand was stronger than the left even in the case of lefthanded persons.

Prof. Rahn's experiments show that the blood and saliva produce the radiation, but that with different people the rays emitted vary greatly. Some people have the power of producing effective radiations and others do not, while it varies with the same person under different conditions.

It was also demonstrated that the human body as a whole sends out rays.

The exact nature of the radiation is not yet determined but it may be some variety of ultraviolet rays, the invisible radiations of wavelengths shorter than visible light. This seems probable because the human rays are effective, as are ultraviolet rays, after being passed through quartz.

Four years ago German and Russian investigators discovered that active muscles of the human body emit a very weak ultraviolet radiation which stimulated the growth of microorganisms, especially yeast. They found that resting muscle and most of the other body tissues did not produce the rays, but that blood from healthy, normal people did radiate.

Tissue from human carcinoma growths or cancers showed strong radiation properties in these early experiments, while, unlike normal blood, the blood from cancer patients did not have the power of radiation.

Prof. Rahn explained that another investigator several years ago found that the blood of women at certain periods sent out a radiation that killed or damaged microorganisms.

These human ray discoveries recall the controversy over radiations given off by onion roots and other growing plant tips. Some scientists have reported the detection of ultraviolet-like rays from growing plants while others have been unable to confirm the phenomenon.

Prof. Rahn in stressing the need for further research on the human rays declared that they are "doubtless a physical influence."

Other investigators of human radiation, he explained, found it to be short-wave ultraviolet radiation of about two thousand angstrom units. There are still many puzzling features about human radiation for it is mostly destructive, while mitogenetic radiation from plants is found to be mostly stimulating.

Science News Letter, July 2, 1932

GEOLOGY

1200-Foot Hole Will Seek Geological Evidence

A 1200-FOOT hole will be drilled down through the soil and rocks of New Providence Island in the Bahamas by an expedition from Princeton University, during the early part of August. The hole is to be made in the interest of geological research; it will yield a core which will teli hitherto unknown facts about the structure and ancient history of the islands. The core is to be shared between the British Museum and Princeton University, and kept as a permanent museum record.

The expedition is to be under the leadership of Dr. Richard M. Field and Dr. Harry Hess of the department of geology.

Science News Letter, July 2, 1932

AVIATION

600 Miles Per Hour is Limit Of Speed for Present Planes

"SPEED" and "air" are words that have a bond of association like "red" and "blood." Man's speediest travel, if we ignore his hurtling through space as a part of earth, solar system, galaxy and universe, is in a racing airplane at 406.9 miles per hour. How much faster can he go?

Physicists of the National Advisory Council for Aeronautics asked this question of the world's highest speed wind tunnel at Langley Field, Va., in which air can be made to rush at 800 miles per hour, which is faster than the speed of sound.

When a racing airplane wing section of conventional form was tested in this air stream, it was discovered that at around 600 miles per hour, the drag or the resistance of the wing to the air increased enormously. It will be almost impossible to supply enough power to the airplane above that speed to drive it through the air. Unless some new and

unusual type of wing is invented, 600 miles an hour is as fast as airplanes can hope to travel. Racing pilots still have 200 miles per hour or so more of speed to conquer.

Even a transport airliner plowing through the air at about a hundred miles an hour has part of it traveling at 600 miles an hour. This is the tip of its propeller turning 1800 revolutions per minute. Such speed is wasteful if the propeller section is not correctly designed. Tests in another N. A. C. A. wind tunnel show that the tip of the propeller at near the velocity of sound is holding the plane back rather than helping it forward. Gearing the propeller so that it turns over once while the engine turns over twice, will increase propeller efficiency.

To the delicate mechanism of the human body which must be able to withstand high air speeds, not speed but changes in speed and direction are dangerous. It is doubtful if a pilot could stand more than 300 miles an hour on sharp turns. Much higher straight-away speeds would be safe if acquired and lost gradually.

Science News Letter, July 2, 1932

HYDRODYNAMICS

Boats Could Double Speed Skimming Surface of Water

SMALL BOATS are given wings under water to double their speed without increasing power consumption in a suggestion made before the meeting of the American Society of Mechanical Engineers at New Haven, Conn., by Dr. Oskar G. Tietjens, research engineer of the Westinghouse Electric and Manufacturing Co.

Frictional resistance in water is 800 times the wind resistance of the same surface in air, Dr. Tietjens said, because water is 800 times as dense as air. For the same reason the lifting force of a plane under the water is 800 times that of the same surface in the air, he stated.

Hence, with small underwater wings or fins, Dr. Tietjens proposes to lift almost the entire craft out of the medium of high resistance into that of little resistance. He calculates that two steel planes, each eight inches wide, one located just forward of amidships and the other just in front of the propeller, would be adequate for a twelve-foot boat, and he thinks such a system practicable for boats from twelve to fifty feet long.

Science News Letter, July 2, 1932

PHYSIOLOGY

Old Age May Be Postponed By Calcium And Phosphorus

EATING simple salts of calcium and phosphorus to build strong healthy bones may also lengthen the prime of life and delay the onset of old age, Prof. Victor K. LaMer of Columbia University, New York, has determined from a review of the work of other scientists.

If the proper amounts of calcium phosphate, a chemical now added to common salt to prevent it from caking in moist atmosphere, were eaten, life might be prolonged some ten per cent. Those who would normally die at 70 might continue to live until 77, Prof. LaMer believes. The specter of old age, the appearance of senescence, would be pushed farther into the future.

Young people, mothers and those in the prime of life will also be benefited by these essential mineral salts in their food. Experiments on rats by Prof. H. C. Sherman and Dr. Louise Campbell of Columbia, with whom Prof. LaMer has been working, have shown that rat mothers, and presumably human mothers, produce babies earlier and longer and raise more children when given a proper amount of these salts in the form of milk powder.

By building strongly calcified bones such as result from a high intake of calcium and phosphorus in the diet, the prime of life can also be prolonged, Prof. LaMer contends.

Calcium and phosphorus can best be supplied to the body by eating liberally of milk and leafy vegetables but it has also been shown that certain inorganic salts of the two elements can function as well as organic forms, such as occur in foods, in meeting the deficiencies of these elements.

Prof. LaMer and associates have worked out a "solubility product principle" by which it may be determined in just what proportion the two elements should enter into the diet to give the best result. Both calcium and phosphorus must be added as the inclusion of just one element may cause trouble.

Decay in teeth may be caused by inadequate amounts and proportions of these two vital bone-building elements. Prof. LaMer recalled the work of Prof. E. V. McCollum of Johns Hopkins on tooth decay in rats.

It is to be expected that some sort of calcium phosphate will in the future be added to common table salt just as iodine is now added to salt in regions where ordinary food is lacking in this element essential to prevention of goiter.

Growing children require twice as much calcium in their food as a normal adult, and mothers need three times that required by other adults.

Prof. LaMer warned that improper bone formation can not always be detected by body weight, and malformed bones may be affecting health for long periods without the person's realizing his condition.

Although important, vitamin D and ultraviolet light can not substitute for the proper amounts of calcium and phosphorous in the diet, Prof. LaMer explained.

Science News Letter, July 2, 1932

ORNITHOLOGY

Rooster Saves Self By Leading Band of Quail

A ROOSTER designed for the frying pan instead has become the proud leader of a band of Gambel quail, according to Custodian Martin L. Jackson of the Montezuma Castle National Monument, Arizona.

Mr. Jackson, craving a feast of fried chicken, purchased a nice young fowl. A little fattening seemed necessary, so the young bird was given a respite. His growth was rapid, and soon, because of resemblance to a comic strip character, he became known as Gump the Rooster.

At first all the feathered inhabitants of the Montezuma Valley seemed to fear Gump. Luckily for him, however, before his frying-pan zero hour arrived the Gambel quail made advances, found him friendly, and adopted him as their natural leader. Soon about 35 quail were observed feasting in the edge of a creosote bush thicket near Mr. Jackson's home with Gump in their midst.

Mr. Jackson now has given up all designs upon Gump's life.

Science News Letter, July 2, 1932

HOMO SOLOENSIS

PALEONTOLOGY

New-Found Java Skull Hints Of Tropical Origin of Man

Location of Famous Pithecanthropus Bones Yields Latest Evidence That Man Has Lived in Java Since Ice Age

MANKIND may have originated in the tropics after all, despite the present wide acceptance of the theory of a Central Asian birthplace of the race.

This suggestion is advanced by W. F. F. Oppenoorth, who with his fellow-engineer and geologist C. Ter Haar recently found the upper half of a primitive human skull and fragments of a second skull at Ngandong on the Solo River in Java. It was on this same river that the famous Pithecanthropus bones were found over forty years ago.

Mr. Oppenoorth bases his suggestion on the decidedly Neanderthaloid shape of the newly found skull-top, which places this Java man on a decidedly higher plane than that occupied by Pithecanthropus, and practically on a par with the Neanderthal men who lived in Europe and Asia at the same time.

The skull of this "Solo man" has a slightly flatter forehead than that of the typical Neanderthaler, and its back portion is cut off much more squarely and sharply. But it has the same generally massive construction, and especially the same beetling eyebrow ridges. What the brain cavity is like has not yet been determined, for only the outside of the skull has been cleared of the stony mass in which it was embedded when found.

Together with Pithecanthropus, dating from a considerably earlier time, and the so-called Homo wadjakensis, of much more recent time, the new-found Solo man builds up a series of human remains indicating that the island of Java has had human or pre-human inhabitants since at least the middle of the Ice Age, and possibly even considerably earlier than that.

The new find also renders improbable, in Mr. Oppenoorth's opinion, the theory that Pithecanthropus was a backward or degenerate race, advanced by Prof. Henry Fairfield Osborn. On this point, Mr. Oppenoorth says:

"Further it is evident that the idea of Osborn, that the Trinil race of Java 'which sought the more genial life in southern tropical forests and plateaus, remained stationary' is not supported by the new find."

The name "Javanthropus" first given to the race represented by the new skull, is reduced to subgeneric rank in Mr. Oppenoorth's preliminary publication, and the skull classified in the same genus with both Neanderthalers and modern men: Homo. The second, or specific, name is derived from that of the River Solo. The full name of "Solo man" who was probably a great-uncle rather than a grandfather of our own race, thus becomes Homo soloensis, or Homo (Javanthropus) soloensis, if one insists on all aliases.

Science News Letter, July 2, 1932

ASTRONOMY

Auroral Green Light Found In Flaring Stars

DISCOVERY of light in new stars that flash out in the heavens that is like the aurora borealis was announced by Dr. Paul W. Merrill of the Mount Wilson Observatory, Pasadena, speaking as chairman of the astronomical section of the American Association for the Advancement of Science at its Syracuse meeting.

A characteristic green line found in the spectrum of earthly northern lights was found by Mount Wilson astronomers in light from several novae, as the mysterious stars that suddenly increase in brilliance are called. This is the first time that the green line has been discovered outside the atmosphere of the earth.

Dr. Merrill concluded that the gases surrounding the new stars are at higher pressures than those in the gas clouds or gaseous nebulae of the sky, but at lower pressures than the upper atmosphere of the earth, where polar lights are born.

Science News Letter, July 2, 1932

RADIO

New Apparatus Measures Kennelly-Heaviside Signals

THE CONSTRUCTION of two new pieces of apparatus for measuring the height of the Kennelly-Heaviside layer, the ionized atmosphere high above the earth with which static and radio escape into interstellar space are thought to be linked, was reported to the meeting of the American Physical Society at New Haven, Conn., by Harry R. Mimno and P. H. Wang of Harvard University.

One will record a complete history of reflections from the Kennelly-Heaviside layer produced by 2,000 successive pulses, it was said. The apparatus, a high speed chronograph, makes its records on a compact strip of photographic paper and may be operated over an extended period of time from five minutes to 24

hours. It also has applications outside the radio transmission field.

The other device is an improved form of the "long film" oscillograph, ordinarily used in pulse transmission experiments. Innovations in its construction are a magnetic clutch, shock absorber and magnetic brake which increase the resolving power without wasting or tearing the photographic tape.

Science News Letter, July 2, 1932

ASTRONOMY

Astronomer Suggests Comets Born of Eruptions From Jupiter

MANY of the comets that appear in the night sky to the telescopes of astronomers may really be the product of eruptions from the surface of the planet Jupiter within the last few centuries, if the theory just proposed by S. Vsessviatsky is correct. In a communication to *The Observatory*, British astronomical journal. Dr. Vsessviatsky, who is connected with the Astronomical Institute of Moscow, renews this suggestion, which was originally made a number of years ago by Richard Proctor, a famous English astronomer.

The "capture theory," held by many astronomers, supposes that these comets originally came into the solar system in parabolic orbits from vast distances. When one happened to pass close to Jupiter, that planet, with its great mass, pulled it out of its former path by gravitational attraction. After that the comet moved in an elliptical path, between the region of the sun and the orbit of Jupiter. Dr. Vsessviatsky points out that if this were the case it would be very rarely that a comet entering the solar system would happen to pass close enough to Jupiter to be pulled into the elliptical orbit. He estimates that it would only happen to something like one in 100,000 comets, but actually, he declares, there are about sixteen of these short-period comets to a hundred parabolic ones. Also, he says, the diminution in brightness of the short period comets indicates that their age is a matter of only a few centuries.

"The conclusion follows," writes Dr. Vsessviatsky, "that the date of birth of a short-period comet does not precede by very long the date of its discovery, whereas captures by the giant planets would occur only at very long intervals." He also points out that all of these comets are moving around the sun in the same direction as Jupiter, and the other planets, whereas if they were captured some would probably be moving the other direction, of "retrograde."

"The connection between these comets and Jupiter can be fully explained by the hypothesis that they are the product of eruptions taking place on Jupiter's surface," he states. In support of this he points out that comets ejected at low speeds would probably be more common than ones of high speeds, and that these would move in orbits not very different from that of Jupiter itself. Their orbits would be more nearly round, and they would not come as close to the sun, as those expelled at greater velocities. Actually, the rounder orbits are more common, though those with the roundest ones would probably not approach close enough to the sun to permit us to observe them at all.

Besides the family of comets related to Jupiter, there are others apparently connected with Saturn, and possibly with Uranus and Neptune.

"The theory," says its proponent, "suggests that very active processes are in progress on the surface of the large planets, resulting in the frequent expulsion of matter. It would be well to study the surfaces of these planets from this point of view, in the hope that traces might be found of the phenomena attending the expulsion of a comet."

Science News Letter, July 2, 1932

OCEANOGRAPHY

Tiny Organisms in Sea Soak Up Much Sunlight

STRIKING evidence of the extent to which the upper layers of the ocean are filled with life has been presented to the American Geophysical Union by Dr. E. O. Hulburt of the U. S. Naval Research Laboratory.

Following observations made by William Beebe of the American Museum of Natural History of the way the sun's light dimmed out as he descended to a depth of 1400 feet in his "bathysphere," Dr. Hulburt made calculations of the light that theoretically should have been there. Good agreement between the candlepower observed by Mr. Beebe, and the candlepower that should have been there according to the calculations, could be found by making the assumption that observed and calculated candlepower fell off at the same rate below a depth of 200 feet; but that in the water layers above that level the actual dimming proceeded five times as fast as the calculations called for.

This could be accounted for by assuming a certain amount of opaque matter in the upper layers of the sea—objects, mostly living organisms, whose bodies absorbed the light falling on them. An absorption as great as this could be accounted for if only 25 millionths of the total bulk of the sea water was occupied by such opaque objects. One small fish, of less than sardine size, per cubic yard of water, would suffice; or the same amount of light-stopping stuff, animal, vegetable or mineral, in smaller but more widely distributed bits.

The color of the light observed by Mr. Beebe just before all light went out was a bluish green. This agreed quite closely with the value calculated by Dr. Hulburt, who found that theoretically the light should have been just a little more bluish than it actually was.

Science News Letter, July 2, 193

LIGHTNING STRIKES A POSE

Paul F. Overdier of Kenosha, Wis., had unusual luck at catching lightning. He shot at a streak of it with his camera, and got two flashes on the same exposure. While he had the shutter open, two bright flashes occurred overhead, causing the skyline to register twice, but failing to spoil the excellent picture he got of the double flash in front of his lens.

MEDICINE

New Vaccine Gives Immunity To American Typhus Fever

A NEW VACCINE which promises to give protection against the endemic typhus fever of the United States has been developed by scientists of the U. S. National Institute of Health, Drs. R. E. Dyer, W. G. Workman, A. Rumreich and L. F. Badger. The vaccine, made in the same way as was that for Rocky Mountain spotted fever, has been successfully used to protect guinea pigs against typhus, and when further perfected it will be used on human beings. The first persons to be given it probably will be the group of men who have developed it, thus following the usual custom of scientists of trying their new products on themselves first.

The vaccine was made from typhus fever infected rat fleas. The fleas were mashed up in a salt solution. Carbolic acid was then added to the emulsion and the whole mixture allowed to stand for five days. This weakened the typhus germs so that they were no longer capable of causing typhus fever to develop, yet were able to stimulate the body's specific powers of resistance to the disease. About half of the guinea pigs receiving the vaccine developed resistance, or immunity as the scientists call it, to typhus fever within two or three months. By using a stronger virus from which to make the vaccine, Dr. Dyer and associates hope to give a higher degree of protection against the disease.

Milder in United States

Typhus fever in the United States is much milder than the disease as it occurs in European countries. There, it is highly fatal, and occurs where crowding or poverty or other factors produce unsanitary conditions. It frequently follows wars and was very prevalent after the World War. In this country it is not fatal, although it is an illness lasting from two to three weeks. It was once thought to be the same as typhoid fever, but in the middle of the nineteenth century the two diseases were distinguished.

Typhus fever is caused by a virus which is transmitted in the United States by the rat flea. In Europe it is caused by a slightly different strain of virus and is transmitted by the body louse. Forms of typhus very similar to the American have been reported from Australia, South America, Mexico and the Dutch East Indies. Dr. Dyer hopes to get strains of the virus causing the disease in these countries to determine whether it is the same as the American.

Science News Letter, July 2, 1932

ENGINEERING

Hollow Steel Planks Form New Flooring

HOLLOW steel planks are welded together to form a new type of flooring which has been developed at the Mellon Institute of Industrial Research in Pittsburgh by Dr. J. H. Young.

Homes, apartments, office buildings and even factories can adopt this kind of construction, Dr. Young explained. He expects it to speed up building, reduce costs and prevent the waste of floorspace. Sections of steel for use in forming the new flooring are already being produced commercially.

Each so-called steel plank is made up of four keystone-shaped ducts, hence the name keystone beam flooring for the new development. When a number of these planks are welded together they make a heavily ribbed flooring which is exceptionally strong.

"Besides being incombustible and fire-safe," Dr. Young stated, "this floor slab is exceptionally adaptable to various types of finishes. Concrete fill may be applied directly to the surface. Ceilings can be suspended from the underside of the flooring, as can steam or water pipes. Plumbing, wiring and various other services are easily installed."

The new type of flooring is seen as a boon to skyscraper construction because of the great reduction in weight it effects. Its keystone-arch-shaped hollow steel slabs, which take the place of masonry types of floors, can be handled as readily as heavy wood planking.

The slabs are about four and one-half inches thick and 24 inches wide. They are made as long as 12 feet 5 inches at present. The readily accessible ducts or cells greatly facilitate the installation of electric wiring.

Science News Letter, July 2, 1932

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2101 Constitution Ave.,
Washington, D. C.,
July 2, 1932.

ASTRONOLY

Stars and Planets Brighten Sky

While the Earth is Most Distant From the Sun, Six Bright Stars and Two Planets Give Interest to the July Heavens

By JAMES STOKLEY

SIX first magnitude stars, among them the largest that is known, and two planets, one the rarely seen Mercury, are making their appearance in the evening skies, which now wear a typically summer aspect. This evening, about nine or ten o'clock look overhead, a little to the east of the zenith. There you will see a brilliant star, the brightest of those now visible, Vega, marking the constellation of Lyra, the lyre. This star, in fact, is the fourth in order of brightness of all the stars in the heavens. Of those that can be seen from the latitude of most of the United States, only Sirius, the dog-star, visible in the winter sky, exceeds it in brilliance.

And now look below Vega, and a little to the north. There you will see a row of stars, crossed by another and shorter row, now vertical, that forms a cross on its side. At the northern end of the cross is another brilliant star. This is Deneb, and it is the lucida, that is, the brightest star, in the constellation of Cygnus, the swan. The vertical row of stars forms the wings, outstretched in flight, Deneb forms the bird's tail, and the long row of stars to the south the long neck. Another name frequently used for this group is "the Northern Cross." Though it does not contain as brilliant stars as the more renowned Southern Cross, which is occasionally seen from the southernmost parts of the United States, it is a more perfect cross. The southern one does not, like its northern counterpart, have any star at the intersection, but consists of four bright stars marking the extremities.

From Cygnus, look more to the south and a little below, and you come to another bright star even more brilliant than Deneb. This is in the constellation of the eagle, Aquila, and Altair is the name of the star. Now look directly south, and there you see a brilliant red star. To the right of it is a group of three rather bright stars, and extending from it to the left is a row which finally curves around into a hook, like the long tail of some animal. And an animal it is, for this is the constellation of Scorpius, the scorpion, and the curved row of stars does represent the tail. In very few instances does an actual group of stars so closely resemble the object after which it is named. Antares is the name of the bright star, a name ("anti-Ares") which means the "rival of Mars." Like the star, the planet Mars has a ruddy color.

Sagittarius, the Archer

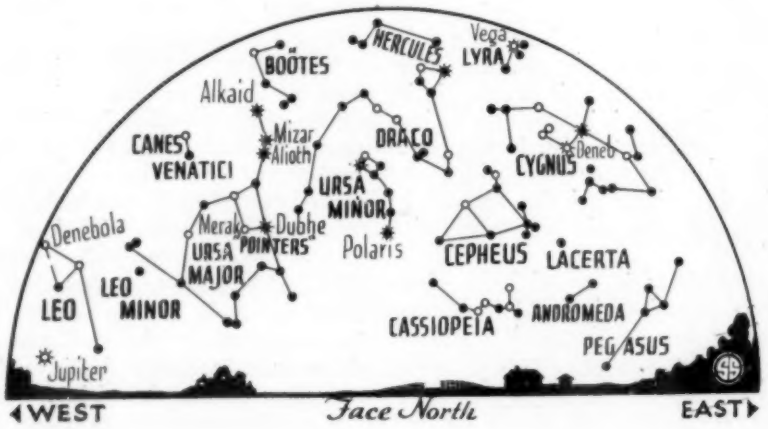
Follow along the line of the scorpion's tail to the east, and you come to another interesting group of stars, though it contains none of the first magnitude. This is Sagittarius, the archer, which, like Scorpius, is one of the zodiacal constellations, through which passes the ecliptic, the path of the sun, the moon and the planets, and which is really the part of the sky where the plane of the earth's orbit intersects it. Incidentally, though Scorpius is one of these constellations, of which there are twelve, it marks considerably less than a twelfth of this imaginary line. The constellation of Ophiuchus, the serpent-bearer, above, though not officially a zodiacal constellation, includes more of the ecliptic than does Scorpius.

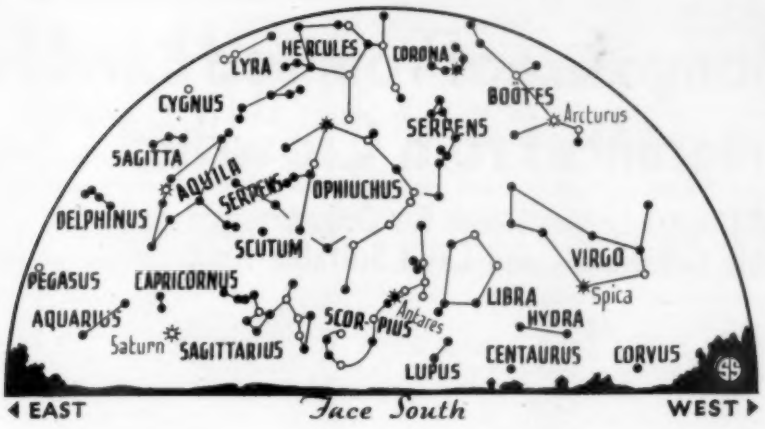
Familiar to everyone is the Great Dipper, in the great bear, Ursa Major, and many people know the little dipper, in Ursa Minor. But in Sagittarius is a third specimen of this implement, often called the "milk dipper." It is the part of the constellation farthest from Scorpius, and the handle now points almost directly upwards, while the bowl of the dipper is turned downwards, as if it were in the act of emptying its contents. Another imaginary figure that is sometimes seen in Sagittarius is the "tea pot." For this, the handle of the milk dipper forms one side of the lid, and the bowl of the dipper forms the handle of the pot. The four stars nearest Scorpius form the spout, so that as we see the figure in the summer evening sky, the tea pot is pouring hot tea upon the tail of the scorpion!

Next to Scorpius towards the west is Libra, another of the zodiacal constellations, but which contains no first magnitude stars. But next to Libra is Virgo, the virgin, in which shines brilliant Spica. Above Virgo is the sixth first magnitude star now to be seen in the evening sky—Arcturus, in Bootes, the herdsman. Of the stars now visible, only Vega exceeds it in brilliance. With Antares and Spica, it forms a large right angled triangle, Spica being at the right angle. Vega, Deneb and Altair form an isosceles triangle, so that if you become familiar with these two trios of stars, you will know the most important ones in the summer evening skies.

Largest Star

And now let us return a moment to Antares, which surely deserves more than passing attention, for it is the largest of all the stars whose diameter has so far been measured. The earth revolves around the sun at an average distance of 92,900,000 miles, and Mars at an average distance of 141,500,000 miles. Yet Antares is so huge that, if it were a hollow shell, there would be room within it for the earth and Mars, as well as the sun itself and the inner





planets, to move in their accustomed orbits without any crowding. Even Mars would be some 53,000,000 miles from the surface, for the diameter of Antares is 390,000,000 miles, or 450 times the diameter of the sun.

The diameter of Antares was measured a few years ago at the Mt. Wilson Observatory, in California, by F. G. Pease, using the stellar interferometer, an instrument invented by the late Prof. A. A. Michelson, famous physicist of the University of Chicago. This instrument was used in conjunction with the 100-inch telescope, the largest in the world, and consists of a beam twenty feet long, fastened to the end of the telescope. Upon this beam slide two mirrors, which reflect the star light to the center of the beam. Here two more mirrors reflect the light down into the telescope. Under these conditions, most stars appear as discs, crossed by dark bands. This is due to interference, when the waves in the two beams of light come together at certain places so as to reenforce each other, and at other places so as to cancel each other.

New Interferometer

As the two sliding mirrors are moved apart, the dark bands begin to disappear, and at a certain point they vanish completely, only to reappear if the mirrors are moved still farther apart. From the distance of the mirrors, the astronomer can calculate the star's diameter. For most stars, the critical distance of the mirrors is far greater than twenty feet, so that only a few are within the reach of the twenty-foot interferometer, practically all of which have been measured, with Antares coming out with first honors. But there has now been completed at Mt. Wilson a new interferometer, with a beam fifty feet long, and with this, it is believed, perhaps a dozen or so additional stars can be measured. Possibly one of these may turn out to be even larger than Antares.

Two planets will appear in the evening sky during July, though one will be visible for only a few days. This is Mercury, which will be seen low in the western sky about July 20. Mercury is so close to the sun that it is never seen far away from that body, and it moves so rapidly that it never stays in the same part of the sky very long. Very different, however, is the other planetary attraction for this mouth. This is the planet Saturn, most distant from the sun of all the naked eye planets. It is in the constellation of Capricornus, in the southeast, below Aquila. Its steady light helps one to distinguish it from a star, which is continually in scintillation. It is of the 0.3 magnitude, not quite as bright as Vega, but brighter than any of the other stars now visible. Saturn is one of the most interesting of all the planets, for it is the one provided with the remarkable system of rings. During the coming months it will come into better position for viewing in the evening, and will be considered in detail a little later in this series of articles.

The earth during July reaches aphelion, that is the position farthest from the sun. This happens on July third, when we are about three million miles farther from that body than we were last January. The phases of the moon during this month are as follows. On July 3 it is new, on the 10th it is at first quarter, directly south at sunset, on the 17th it is full, and visible all night, while on the 26th it is at last quarter, when it rises at midnight. Thus, from about the 7th to the 20th, will be moonlight evenings.

Though it will not happen until the 31st of next month, August, astronomers have now begun to get ready for the total eclipse of the sun which will be seen on that date along a path crossing parts of Quebec and the states of Vermont, New Hampshire, Maine and Massachusetts. It will happen about 3:30 p. m., eastern standard time, so it should be a good opportunity to see this rare and magnificent natural spectacle. Not until 1970 will another be seen from the United States. Details of this important event will be given in next month's article.

Science News Letter, July 2, 1932

ARCHAEOLOGY

Indians Ate Red Peppers Nearly a Thousand Years Ago

RED PEPPERS, such as the housewife uses in making salads and pickles, were part of the bill-of-fare of Southwestern Indians nearly a thousand years ago. That these hot dainties tickled Pueblo tongues centuries ago has been proved for the first time by the discovery of a lot of pepper seeds, buried four feet beneath the present ground level in the ruins of Mattocks pueblo, thirty miles east of Silver City, N. M., on the Mimbres river. The find was made by Paul H. Nesbitt, curator of the Logan Museum of Beloit College.

The seeds were identified by Dr. Melvin R. Gilmore of the University of Michigan Museum, a specialist on the botany of ancient Indian food plants. Dr. Gilmore said of the present find:

"This is so far the first specimen of this species of plant to come to hand. Although an American plant it is scarcely known in the wild state. It is much used in Yucatan as well as Mexico for flavoring food. This is the first example to come from the Southwest."

The position and arrangement of the seeds as found indicated that they had been in a bunch of peppers hung up on a rafter to dry. The bunch had fallen to the floor, and the pods disintegrated.

The find belongs to the Indian archaeological period known as Early Pueblo III, dated at about 1000 A. D.

Science News Letter, July 2, 1932

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ECONOMIC GEOGRAPHY

Mongolia no Promised Land For Emigrants From Crowded China

Gobi Desert Leaves Room for Only Limited Areas in Arable Grasslands and Land Suitable for Irrigation

Following is the third of a series of four articles on the tangled and vexed situation in the Far East as seen by leading geographers.

IF CHINA loses Manchuria as breathing space for some of her tightly packed millions of people, she cannot hope to turn to Mongolia, farther inland, find an outlet "just as good."

Mongolia has its possibilities. It is valuable and usable territory, as China, Japan, and Russia all recognize. But a thumbs-down verdict on Mongolia as a Promised Land for Chinese pioneers is rendered by two geographers who have made a special study of that particular situation. Their observations are reported in a new publication of the American Geographical Society, dealing with "Pioneer Settlement" throughout the world.

One of these specialists in Far Eastern geography, George B. Cressy, declares: "The roseate hopes often held out that Mongolia may be able to absorb great numbers of settlers from south of the Great Wall are without foundation. So long as the physical environment remains as now, the bulk of Mongolia is not land for the farmer."

Where Manchuria has absorbed millions of Chinese pioneers, perhaps as many as 20,000,000, Mongolia has taken in only tens of thousands.

It is true that Mongolia lays out a welcoming doormat to Chinese of the crowded northern plain. This welcome is an alluring stretch of fertile grassland north of the Great Wall of China.

A good many Chinese have spread over into this part of Mongolia. Where they have settled there are well-cultivated fields of barley, oats, flax, millet. But Mongolia's welcoming grasslands extend no more than a hundred miles north of the Great Wall. Beyond that begins the Gobi Desert, which is so large and so discouraging a part of Mongolia.

There are other patches of arable land in other sections of Mongolia. Irrigation has made some additional farm land, and forced the wilderness to yield apricots, nectarines, and other fruits.

A large irrigation project to utilize water from the Hwang Ho River is now nearing completion, Mr. Cressy reports. This will reclaim 335,000 acres of heretofore arid land. The main canal, dug by hand, is 40 miles long. With a dependable supply of water, that particular district should prosper and no longer fear famine in drought years. But the future may not work out so favorably. In such situations in Mongolia, Mr. Cressy explains, the problem is to keep the people from pouring in to tax the productivity of the land to its utmost.

Chinese pioneers in Mongolia are young people, in the western area at least, writes Owen Lattimore in the same book on "Pioneer Settlement." Hard times in China force younger sons to trek north in bands. They take over land from nomad Mongols. On this land the young pioneers build mud huts and break ground for planting. After the first harvest they go back to fetch their women and children. The typical village "elder" in such a community is a man not past his thirties.

Social conditions among these pioneers are looked upon (*Turn to page* 11)

RADIO

The Science Service radio address next week will be on the subject,

FEEDING THE GROWING POPULATION

by

Dr. William Crocker

Director of the Boyce Thompson Institute for Plant Research, Inc., at Yonkers, N. Y.

FRIDAY, JULY 8

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ZOOLOGY

NATURE RAMBLINGS
by Frank Thone

Our Friend the Bat

See Front Cover

WITH THE COMING of warm summer weather, and the arrival in number of insects to eat, bats are becoming more noticeable as they make their noiseless nightly patrols. Because of their nocturnal, and therefore mysterious habits, and because of their preference for homes in caves and dark holes, our ancestors came to regard them as evil and sinister creatures, and equipped their demons with bats' wings, and told wild tales about bat-vampires that sucked human blood.

As a matter of fact, bats are harmless and humorous creatures, and their food habits make them great friends of man. Their dodging, erratic flight through the dusk is occasioned by the dodging, erratic flight of their prey, which consists mainly of insects. Though bats are not blind, but have sharp little eyes that probably see fairly well in the half-light, it is probable that they are guided more by hearing than by sight, for their ears are relatively enormous. It is probable also that some, if not all, bats have a sixth sense related to hearing, whereby they can perceive air vibrations of low frequency, for many of these animals have special organs with large supplies of nerves.

Bats are unique animals in that they are the only mammals that fly. Their wing-bones are really enormous elongated fingers, with webs of nearly naked skin stretched between. If the fingers of a man were stretched out in proportion, they would be nearly four feet long.

The bat photo on the front cover of this issue of the SCIENCE NEWS LETTER is by Cornelia Clarke.

Science News Letter, July 2, 1932

as barbarous by Chinese stay-at-homes who have not ventured north beyond their Great Wall, Mr. Lattimore finds.

"Social ties, especially in the first years of settlement, are loose," he writes. "Men fail or become discouraged and abscond, and their wives go to other men. Young men drift away for a season of caravan work, and their wives 'lean,' as the expression goes, on other men. Parentage of children is often doubtful, and filial piety is not comparable as a social force to filial piety in China proper."

Everything considered, Mr. Lattimore concludes that "the Chinaman, pushed out of his country by pressure of population and grinding poverty, does not win his way into a better world by emigrating to Mongolia as a pioneer."

For the first few years, the pioneer may have more food to eat. But he has brought traditions and customs of China out to the new edge of civilization. And that means that in a few generations the community is just as poor and crowded and hungry as it would have been back home.

The reasons, traced by Mr. Lattimore, are two. First, the old story of excessive regard for family, leading to early marriage of sons in order to provide grandsons. A family will contract debts from which there is no hope of recovery merely in order to hasten a marriage. The second handicap is lack of a stable financing system.

"There is no such thing as a safe Chinese paper currency or a safe Chinese bank," writes Mr. Lattimore. "Banks may be ruined and their paper currency rendered valueless by a political upheaval or a civil war."

Until Chinese customs and standards change, pioneers in Mongolia have little chance to escape from these handicaps, it appears.

Science News Letter, July 2, 1932

ASTRONOMY

Two New Comets Discovered By American and Australian

A NEW COMET has been discovered by Kenneth A. Newman, a young astronomer at the Lowell Observatory, Flagstaff, Arizona, it was announced by Harvard College Observatory, American clearing house for astronomical news.

Mr. Newman first saw the new visitor to our celestial neighborhood on June 1, but he did not report his discovery until he had made the three separate observations needed by astronomers to calculate the orbit of a newly discovered body in the heavens. These observations he made on the nights of June 1, 7 and 20.

Newman's Comet, as the new find will be known, is of the thirteenth magnitude, so faint that it can be seen only with a powerful telescope. Like many of the smaller comets, it lacks a tail.

During the time it has been under observation, the comet has been in the neighborhood of the constellation Serpens, the Serpent. It has been moving toward the northeast, and about June 7 crossed the celestial equator, an imaginary line in the heavens directly over the earth's equator. Its position when last observed by Mr. Newman was, in the astronomical equivalents for latitude and longitude, right ascension fifteen hours thirty-seven minutes fifteen seconds, declination seven degrees fifty-six minutes north.

The second comet in two days is the unusual astronomical record established by the discovery of one of the celestial wanderers by a young Australian astronomer named Geddes, early on Wednesday morning, June 22. The find was reported to the international clearing house for astronomical news at Copenhagen by Dr. J. M. Baldwin, director of the Melbourne Observatory.

The new Geddes comet lies in the far southern skies, well to the southeast of the constellation of the Southern Cross, and hence cannot be observed by astronomers in the northern hemisphere. It is below naked-eye visibility, being of only tenth magnitude. Its position as reported by Dr. Baldwin was right ascension nine hours fifteen minutes, declination minus eighty-four degrees thirty-six minutes.

Science News Letter, July 2, 1932

Fahrenheit thermometers owe their name to the inventor, Daniel Gabriel Fahrenheit, who died in 1736.

• First Glances at New Books

Biography

LIFE OF MENDEL—Hugo Iltis, transl. by Eden and Cedar Paul—*Norton,* 336 p., $5. The English-speaking world has long been waiting for a really adequate biography of the man who founded genetics as a real science, and in rendering Iltis's book into such readable form the translators have made all biologists their debtors. Iltis shows us many things about Mendel's life that were hitherto unknown or imperfectly known: that the monastery where he was "buried" was really a cultural center of the first order; that Mendel was a versatile man of affairs as well as a monk and a scientist; that he tried his hand at other sciences besides genetics, including meteorology, geology and apiculture.

Science News Letter, July 2, 1932

Geology-Geography

THE BALTIC REGION—E. G. Woods—*Dutton,* 434 p., $5.50. The characteristic geology and physical geography of the Baltic countries are the main subjects of this book; though writing of the land leads the author on to tell how land forms have determined the course of human life and settlement in the Baltic. The geologic history of the region is of particular interest. Countries included in this study are Sweden, Finland, Denmark, Germany, Esthonia, Latvia, and Lithuania. A large number of drawings of scenic and cultural features and 54 maps and diagrams add to the attractiveness and value of the work.

Science News Letter, July 2, 1932

Anatomy

A DESCRIPTION OF THE PLANES OF FASCIA OF THE HUMAN BODY, WITH SPECIAL REFERENCE TO THE FASCIA OF THE ABDOMEN, PELVIS AND PERINEUM—B. B. Gallaudet—*Columbia University Press,* 75 p., $2. The author has described, from his own dissections, the fascial planes in three regions in which, in his opinion, they are inadequately described in present English and American texts.

Science News Letter, July 2, 1932

Archaeology

ARCHAEOLOGICAL ATLAS OF MICHIGAN—Wilbert B. Hinsdale—*Univ. of Michigan Press,* 40 p., 20 maps, $6. Michigan, with its copper mines, held a position of high economic importance in prehistoric America: the prehistoric geography of Michigan is, therefore, of especial interest. The maps made for this atlas show in very clear, red symbols such features as villages, mounds, garden beds, trails, ancient excavations for copper. The text pages contain enough descriptive matter to "make clear the information presented upon the maps." The atlas is an admirable piece of work, which may well serve as a model for similar publications in other states.

Science News Letter, July 2, 1932

Anthropology

ANTHROPOLOGY AND MODERN LIFE—Franz Boas—*Norton,* 255 p., $3. A revised, in fact completely re-written, edition of a book which first appeared in 1928. Dr. Boas believes that "a knowledge of anthropology enables us to look with greater freedom at the problems confronting our civilization." The political and economic changes that have occurred since 1928, and the progress of anthropological studies since then, have reenforced his convictions; and he has in this book brought up-to-date his views on races, nationalism, eugenics, criminology, education and other present-day problems.

Science News Letter, July 2, 1932

Geography

APPLETON'S STANDARD SCHOOL ATLAS—ed. by George Philip and V. C. Finch—*Appleton,* xxviii×VIII×63 p., $1.50. A good atlas for elementary school use. The principal maps stress physiographic features.

Science News Letter, July 2, 1932

Ornithology

THE BIRDS OF CHILE—Charles E. Hellmayr — *Field Museum,* 472 p., $2.50. A thorough-going systematic monograph, which will be welcomed by both field and museum ornithologists.

Science News Letter, July 2, 1932

Chemistry

A COURSE IN QUANTITATIVE ANALYSIS—J. Samuel Guy and Augusta Skeen—*Ginn,* 242 p., $2.20. This is a text that is intended for use in an elementary collegiate course rather than as a reference book.

Science News Letter, July 2, 1932

Medical Economics

THE HEALING CULTS: A STUDY OF SECTARIAN MEDICAL PRACTICE, ITS EXTENT, CAUSES AND CONTROL—Louis S. Reed—*University of Chicago Press,* 134 p., $2. Publication of the Committee on the Costs of Medical Care. In order to present a comprehensive picture of medical service in the United States the Committee has included this survey of the various cults. Their history and numbers, distribution, economic importance, legal status, relations with doctors of medicine, and the nature and quality of their training and service are all given.

Science News Letter, July 2, 1932

Medicine

COLLECTED REPRINTS FROM THE GEORGE WILLIAMS HOOPER FOUNDATION, Vol. XIII—*University of California.*—This volume contains reprints of 93 reports of medical research done under the auspices of the Hooper Foundation during the period, 1929-1931. A wide range of subjects is covered. The book will be a valuable addition to the reference library.

Science News Letter, July 2, 1932

Child Health

PSYCHOLOGY AND PSYCHIATRY IN PEDIATRICS: THE PROBLEM—Report of the subcommittee on psychology and psychiatry of the White House Conference on Child Health and Protection, Bronson Crothers, chairman—*Century,* 146 p., $1.50. The value of this report is enhanced by the addition of extracts from the discussion at the Conference, descriptions of existing child guidance clinics, letters describing typical programs, etc.

Science News Letter, July 2, 1932

Education

SCHOOL MANAGEMENT—Edited by Clyde R. Miller—*School Management, Inc.,* 50 p., $2 per year. A new magazine of compact, convenient size appealing especially to the principal, superintendent or other administrative officer of the school, but containing some articles of more general interest.

Science News Letter, July 2, 1932

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